

## **REMARKS**

The Final Office Action of September 26, 2005, has been reviewed by the Applicants. Claims 2 and 4-6 have been cancelled. Claims 1 and 3 are pending. Applicants request entry of the amendments and reconsideration of the application.

### **A. The objections are moot.**

Claim 2 and 4-6 were objected to as being improper dependent claims for failing to further limit the subject matter of a previous claim. Claims 2 and 4-6 are cancelled herein. Consequently, the objection to these claims is moot.

Applicants request withdrawal of the objections.

### **B. Claim Amendments**

Claims 1 and 3 are amended to recite that an isolated polynucleotide that encodes a plant polypeptide is capable of controlling leaf shapes of rice. Support for the amendment may be found, for example, on page 3, lines 21-22; page 4, lines 1-5; and Figures 1-3.

### **C. The claims are enabled.**

Claims 1-6 were rejected under 35 U.S.C. 112, ¶ 1, as failing to comply with the written description requirement. Claims 1 and 3 remain pending. Applicants traverse this rejection.

The Examiner stated that the specification "fails to provide guidance for how to use" SEQ ID Nos: 1 and 2. Applicants reply under the belief that the Examiner questions whether the specification teaches how to use the claimed invention (as opposed to how to *make* the invention). MPEP § 2164.

Applicants submit that one skilled in the art would know how to use the claimed polynucleotides in view of the filed specification and the common knowledge of the art as of the priority date. Specifically, a person skilled in the art would be able to obtain the invention set forth in the amended claims using, for example, transposon Tos17. The use of transposons was widely known as of this application's earliest priority date. (See page 1, line 22 to page 2, line 18).

The Examiner's rejection focuses on whether the present application teaches the effect that overexpression would have on plants with different leaf structures. The Examiner relies on the Schneeberger and Hareven references for the proposition that a plant in which a gene controlling leaf shape is altered has an unpredictable phenotype and that the effects of overexpression of a gene encoding a protein controlling leaf shape must be determined empirically. Applicants respectfully submit that the Examiner has misunderstood the subject of the claimed invention.

First, the references themselves do not teach that overexpression affects the leaves in various plants. Hareven, for example, discloses that when *knotted-1* is overexpressed in maize, the leaves of the mutated plant remain unaffected unlike that of the tomoato plant, which has compound leaves. (Page 735, right hand column, second paragraph, lines 32-36; Figure 1, page 736).

Second, despite the references failure to teach overexpression as affecting certain plants, such as rice, overexpression is not the utility in the present invention. Specifically, using the nucleic acid encoding SEQ ID NO:2 and SEQ ID NO:1 does not require the overexpression of these sequences. Rather, it is the disruption of the nucleic acid sequence of SEQ ID NO:1, which encodes SEQ ID NO:2, that is the utility of the pending claims. Disruption, not overexpression, of nucleic acid sequence SEQ ID NO:1 results in altering the leaf shapes of rice.

As amended, claims 1 and 3 recite that the polynucleotide encodes a polypeptide capable of controlling leaf shapes of rice. The specification, as originally filed, demonstrates the effect of disrupting the polynucleotide encoded by SEQ ID NO:2 in rice by using the transposon Tos17. The resulting homozygous genotype, which has a phenotype of altered leaf shapes, is due to a stable mutation of in the polynucleotide of SEQ ID NO:1, which encodes SEQ ID NO:2. (See, e.g., Examples 1-4; page 3, lines 5-6; and page 11, lines 14-19).

The Examiner even acknowledges that the specification clearly demonstrates the functionality of the claimed polynucleotides in rice, as recited by the claims. Specifically, the Examiner states that the specification, and particularly the examples, provides guidance for activating a Tos17 retrotransposon in rice plants, isolating narrow-leaf mutants, showing that Tos17 was linked to the mutation, isolating the gene responsible for the mutation, and constructing and isolating a cDNA that corresponds to the gene.

The application, therefore, enables a person how to use the invention because (1) the utility of the invention is in disrupting the nucleic acid sequence of SEQ ID NO:1 in rice, and (2) the specification demonstrates that the effect of disrupting the nucleic acid sequence of SEQ ID NO:1 in rice. For at least these reasons, the specification enables the claims.

But even the Schneeberger and Hareven references provide knowledge of how to use the invention. The Examiner is correct that Schneeberger and Hareven do not teach the functional analysis of disrupting SEQ ID NO:1, which encodes SEQ ID NO:2 in rice. Disruption of SEQ ID NO:1 of the claimed invention does not lead to any physiological defects in rice plants other than altered leaf shapes. These references, however, still provide guidance to enable a person skilled in the art to use the claimed sequence as described.

Schneeberger discloses that the *rough sheath2* gene is essential for elaboration of normal leaf morphology (see page 2857) and that the failure to down-regulate *knox* gene expression in maize plants results in abnormalities in leaf shape, leaf insertion points, and internode development (see page 2863, left-hand column, first paragraph, lines 1-5). Therefore, Schneeberger shows that disruption causes the phenotype of a plant to change.

Hareven teaches that misexpression of *knotted-1* affects compound leaves in a very different way than it affects simple leaves, that all simple leaves are morphogenetically rigid, that simple leaves are determined by the same developmental program, and that gene systems that condition them are conserved among species having simple leaves, such as rice leaves (Page 735, right-hand column last paragraph; page 741 last paragraph to page 742, left hand column, second paragraph). Thus, based on Hareven, a person skilled in the art would know that disrupting a gene in a plant with simple leaves could be predicted to have the same outcome in other plants with simple leaves. Consequently, a person skilled in the art would know how to use the polynucleotides in rice plants as set forth in claims 1 and 3. Therefore, the claims are enabled.

The Examiner states that undue trial and error experimentation would be required to determine what, if any effect, the transformation of a plant with the claimed sequences would have and how to use such plants. She lists the claim breadth, unpredictability of the art, and lack of guidance in the specification for this finding. The claims, however, are now limited to rice plants, and, for the reason set forth above, Applicants submit that the

specification enables the scope of the claims. Applicants submit that the requirements of 35 U.S.C. 112, ¶ 1 are met and request that the rejections be withdrawn.

**D. Other items are addressed.**

Applicants acknowledge the Examiner's finding that SEQ ID NO: 2 is free of the prior art.

Applicants have also submitted new claims 5 and 6. Support for these claims is found throughout the specification. Applicants note that the new claims are narrower than claim 1 or 2.

## CONCLUSION

For the reasons given above, Applicants submit that all pending claims (1 and 3) are in condition for allowance. Applicants request entry of the amendments. Applicants submit that the amendments place the claims in better condition for allowance. Withdrawal of the rejections and issuance of a Notice of Allowance are requested.

In the event the Examiner considers personal contact advantageous to the disposition of this case, she is hereby authorized to call Richard M. Klein, at telephone number 216-861-5582, Cleveland, OH.

It believed that no fee is due in conjunction with this response.

Respectfully submitted,

**FAY, SHARPE, FAGAN,  
MINNICH & McKEE, LLP**

DATED: December 23, 2005



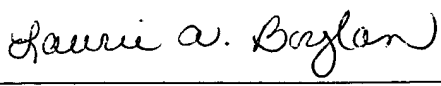
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### CERTIFICATE OF MAILING

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